F3CL/F3RO
Clip-On Ultrasonic Flowmeter

RS485

OCT Pulse & Relay

4~20mA

Product Overview

F3CL and F3RO adopts the ultrasonic transit time measurement principle, combined with Gentos' patented flow algorithm technology, it realizes accurate measurement of the fluid flow in the pipe. The product is all-in-one and clip-on structure design, which is simple and convenient to install. Only four steps are needed all along. The installation process requires no contact with fluid media and no need to shut down the flow.

The standard configuration of the product is the RS485 communication interface commonly used in industrial occasions. With Modubs protocol, it can realize remote monitoring and data transmission of instruments.

Product Features and Functions

Features

- Easy to install, no pipe damaging
- No adjustment
- LCD color display
- Screen display in 4 direction rotation

Functions

- Flow Controlling and Monitoring Totalizer
- Water distribution
- Leak monitoring

Applications

HVAC, washing industries, residential water, modern agricultural irrigation, garden irrigation, water in production process, industrial circulating water, reclaimed water, pure/ultra pure water, bathing industry, swimming pool, laundry industry, inland aquaculture, etc.

Principle of ultrasonic flowmeter

The ultrasonic flowmeter adopts the Transit Time measurement principle. It uses an ultrasonic signal from the transducer to travel in a flowing fluid, the velocity of sound wave increases parallel to the flow direction and decreases opposite to the flow direction.The transmission times are different at the same propagation distance, the flow rate of the fluid is measured according to the relationship between the difference of the transit time and the flow rate of the measured fluid.

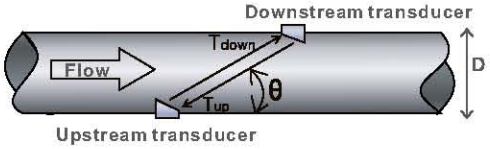
The flow velocity of the fluid is different at different locations within the pipe, the flow rate in the center of the tube is faster than that near the wall of the pipe. The flow velocity distribution of a fluid in a pipe can be expressed in terms of flow velocity section distribution diagrams.

By setting the flowmeter and considering the influence of cross-sectional distribution of flow velocity, the average flow velocity can be calculated and the volume flow of the fluid is derived from the cross-sectional area of the pipe.

$$V = \frac{MD}{\sin 2\theta} \times \frac{\Delta T}{T_{up} \cdot T_{down}}$$

Note

V: Fluid Velocity
M: Times of ultrasonic reflections
D: Pipe diameter
θ: The angle between the ultrasonic signal and the fluid
T_{up}: Time of the upstream transducer transmitting a signal upstream
T_{down}: Time of the downstream transducer transmitting a signal downstream
$\triangle T = T_{down} - T_{up}$



F3 Series Comparison Table

Model Type	Output Configurations	
F3CL	RS485	4~20mA
F3RO	RS485	OCT Pulse or Relay

Note: According to user's need, there are three kinds of Outputs: RS485+OCT Pulse, RS485+Relay and OCT Pulse+Relay.

Installation Method

All in one design, easy to install
No need to damage pipe or shut down the flow
Simple setting with the 4 operation keys


Step1:Take out the brackets


Step2: Clip on the pipe


Step3: Install the main device


Step4: Connect to Power

Product Model

Format of Selection Model: F3CL/F3RO; Format: A-B-C

Model

F3CL

F3RO

Description of Transmitter

Flow Range:	0.1 ft/s ~ ±16ft/s (0.03m/s ~ ±5m/s)	Housing Material:	ABS+PC
		Power supply:	10 ~ 36VDC, max 500mA
Accuracy:	± 2.0%	Communication Interface:	F3CL: RS485 and 4-20mA(Max load resistance750Ω) F3RO: RS485 and OCT pulse or Relay All comes with Fuji and Modbus protocol
Repeatability:	0.2%		
Display:	LCD1.44"		
Protection Rate:	IP54		
Pipe Size(Optional):	DN20 ~DN80 (O.D. 21mm-91mm.)	Ambient Temperature:	14°F to 122°F(-10°C~50°C)
Cable Length:	6.6ft (2m)	Fluid Temperature:	32°F to 140°F(0°C~60°C)

Specifications

A — Output Selection

1	F3CL, RS485+4~20mA
2	F3RO, RS485+OCT pulse
3	F3RO, RS485+Relay
4	F3RO, OCT pulse+Relay

B — Pipe Material (4 modes)

1	PVC (Plastic)
2	Carbon Steel
3	Stainless Steel
4	Copper (Brass)

C — Pipe Size

Pipe OD Range

For Pipe Material (PVC, Carbon Steel, Stainless Steel)

Nominal		Outer Diameter	
Metric	Inch	Metric	Inch
DN20	3/4"	21~29mm	0.827"-1.142"
DN25	1"	28~36mm	1.102"-1.417
DN32	1-1/4"	35~43mm	1.378"-1.693"
DN40	1-1/2"	46~54mm	1.811"-2.126"
DN50	2"	59~67mm	2.323"-2.638"
DN65	2-1/2"	72~80mm	2.835"-3.150"
DN80	3"	83~91mm	3.268"-3.583"

For Pipe Material (Copper)

Nominal		Outer Diameter	
Metric	Inch	Metric	Inch
DN25	3/4"	21~29mm	0.827"-1.142"
DN32	1" or 1-1/4"	28~36mm	1.102"-1.417
DN40	1-1/2"	35~43mm	1.378"-1.693"
DN50	2"	46~54mm	1.811"-2.126"
DN65	2-1/2"	59~67mm	2.323"-2.638"
DN80	3"	72~80mm	2.835"-3.150"

Selection Sample: F3CL-1-1-DN20
Description: Model F3CL with RS485 and 4~20mA outputs, applied to pipe size DN20, PVC pipe.